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P A P E R S

IN

M E C H A N I C K S.

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M E C H A N I C K S.

The GOLD MEDAL, or ONE HUNDRED POUNDS, at the option of the Candidate, being the Premium offered for the Discovery of a Quarry of MILL-STONES, similar to the Stones known by the name of FRENCH BURRS, was this Session adjudged to Mrs. CATHARINE BOWES, and her CHILDREN, by her late Husband, Mr. RICHARD BOWES, of Conway, in North Wales, and who made choice of the pecuniary Reward. The following Accounts and Certificates were received relative to these Mill-stones.

SIR,

THE Rev. Mr. Hughes, of Kemel, has done me the honour of a call, and desired me to give you an account of the

Burr-Stone Quarry, and to send you specimens of the stone. A box of them, therefore, is sent to you by the mail of this day.

The quarry, which I hold from the liberality of J. Sneyd, Esq. of Belmont, in Staffordshire, is situated within the Corporation Liberties of Conway: the stone appears within a quarter of a mile of that town, and extends from east to west for the distance of two miles, appearing in most places upon the surface within that distance. Such an immense body of the stone has been left bare and exposed to view, that the industry of ages would scarcely lessen it. A deep chasm intervenes at the end of two miles; and, on examining the same line across this valley, I find the stone mixed up with various other fossil substances, to which it seems to bear no relation. In the next rise of mountains it resumes its quality, and takes a southerly direction,
passing

passing through a range of hills to the distance of two miles more, where the vein disappears. It is every where the highest stratum; and, when disengaged from the quarry where now worked, it tumbles down the side of the mountain to the plain within five hundred yards of the shipping-place, where small vessels may lie safely in all weathers at a natural quay, completely calculated for this business.

The quarry lies on the decline of a hill: the vein now is about eight yards wide; but we have reason to suppose it is wider below. At the depth we have sunk, which is at least twenty-five feet, the stone mends in quality. When first taken from the quarry it is much softer, and easier wrought into shape, than when exposed to the air; even a day makes a difference. The vein appears to me quite inexhaustible, and contains every variety of the stone, cellular, close,

hard, or soft. The right in this tract of country has been presented to me by Mr. Sneyd, under the hope that I might be able to make this discovery, and carry it vigorously into effect, in which he has not been disappointed. I came into possession on a Wednesday in August, 1797; I set hands to work the remainder of the day.—I had a quantity shipped on the Saturday—it arrived at Liverpool on the Sunday, and was under manufacture on the Monday morning. In order to entitle me to the Premium for the discovery and application of the Burr-stone Quarry, I inclose, for the inspection of the Society, several papers to certify the truth of my claim, and to show the progress I have made. There are two Papers from the hands of our Clergyman and Churchwardens, also from the Officers of the port of Conway, proving that I have carried the trade to a considerable extent: this has been done
against

against the prejudices of a very confined neighbourhood, during the time I was unacquainted with their language, and entirely a stranger in the country. The money I have expended in this pursuit was the saving of a life of labour; and I have no resource but the Burr-stone quarry, and my own industry, for the maintenance of a wife and family. I have also a numerous working establishment depending upon me for support, which I have drawn together from different quarters.

When favoured with your Society's notice, it will prove to the kingdom at large the estimation in which this material is held, and assist to do away the prejudice attending all new pursuits.

A pair of mill-stones, four feet diameter, shall be laid down for the inspection of the Society in the Adelphi; and I will attend the Committee, to reply to any other

othe. inquiries they shall think proper to make.

I am, SIR,

Your obliged and obedient servant,

RICHARD BOWES.

Conway,
December, 1799.

To the Secretary of the Society for
Encouragement of Arts, &c.

WE, the Minister and Churchwardens of the parish of Conway, do hereby certify, at the desire of Richard Bowes, that a Quarry of the material called Burr-stone, similar to that called French Mill-stone, has been opened in the Liberties of the Corporation of Conway, several cargoes of which have been shipped from this port, by the above-mentioned Richard Bowes, at his own
risk

risk and charge. A manufactory thereof is begun, and a number of workmen regularly employed; consequently the industry of the neighbourhood, and the general interest of agriculture, are promoted.

EDWARD OWEN, Vicar of Conway.

For self, and my Colleague in his absence,
ROWLAND JONES.

Conway,
December 5, 1799.

WE, who have hereunto set our names, do certify, that Richard Bowes has opened a Quarry of Stone within the Liberties of the Corporation of Conway, resembling the French Burr, used for grinding corn. Several cargoes of this stone have been shipped from hence for different parts, and a considerable quantity is at this time ready for shipping. A manufactory of this material

rial for making mill-stones has been opened here by the said Richard Bowes; and we are of opinion, with other persons who are competent judges in the milling business, that the said stones are a complete substitute for the French Burr, and that they will operate on grain equally.

WILLIAM ELLIS, per Co. Officer
and Collector.

SAMUEL READ, Comptroller.

WILLIAM JONES, Tide-Surveyor.

Conway,

December 6, 1799.

WE, the Millers to Mr. Blundell, at Beverton-Bush Windmill, do hereby certify, and are willing, if required, to make oath, that we have worked the Welch or Conway Mill-stone, above four feet in diameter, upon wheat for several months past, in opposition to a
French

French stone; and, it is our opinion, that it operates on the grain, and produces as good flour as the nature of the wheat wrought upon will admit, and approaches, both in texture and effect, nearer to the French Burrs than any we have ever known.

PETER CALAVAL.

WM. MYVING.

Witness,

SAMUEL LARIGO.

Liverpool,
December 20, 1799.

I HENRY GARDNER, millwright, and mill-stone manufacturer, do hereby certify, at the desire of Richard Bowes, that I have manufactured into Mill-stones about twenty tons of the Conway Burr-stone, for the purpose of grinding wheat; that five pairs, above four feet diameter, are composed of that
stone

stone only, three pair of which are in actual work; and the principal part of the remainder of the twenty tons has been intermixed with French Burrs in the manufacture of Mill-stone, it being my opinion that they are a good substitute for the French.

HENRY GARDNER.

Witness,
SAMUEL LARIGO.

Liverpool,
December 20, 1799.

SIR,

WE comply with your desire in noting the present situation of your cargo of Welsh Burr-stones, which, shortly after landing, we brought home to our own stores. The quantity is about forty tons; and we manufactured them into Mill-stones, with as much success as could be expected to attend
a new

a new undertaking of the kind, particularly as we were not then acquainted with the best mode of making them up: of course, as the readiest method, we put the face of the burrs to the work, instead of the ends and edges; this mistake we have lately rectified, and find such stones as have been made on the improved plan, will answer as well as could be possibly wished. Indeed, from the reports of the millers at present working the three pair properly made, we have every reason to expect, that the importation of French Burrs will hereafter be discontinued, at least to this part of the kingdom. In the cargo we received one perfect Mill-stone, with the eye formed: it measures at present about five feet, and, when rounded for work, may measure about four feet ten inches, which is reckoned a large stone. We have not yet offered it for sale, as we wish to keep it as a sample of what your quarry can produce if properly encouraged, as nothing,

thing could show its superiority over the French more than this stone, which comprehends, in one body, at least the size of from twenty-five to thirty-three of the Burrs we usually receive from the French coast. We have nothing particular to add, but that we have within the last month procured three very expert hands, who have been used to this kind of work; of course we expect a few weeks will now complete a fresh quantity, as we have not, at present, a single stone remaining unsold of those made on the improved plan.

We remain respectfully,

Your most obedient servants,

EDWARD STEPHENS and Co.

Dublin,

December 26, 1799.

Mr. RICHARD BOWES.

In

In addition to the above testimonials, the Society have received the following Certificates, viz. from Mr. Samuel Larigo, of Liverpool, stating the opinions of the working millers at that place, that, with proper selection in the combination of the Mill-stones, the Conway are a good substitute for the French Burr-stones; and that he had paid duty for fifty tons imported into the port of Liverpool.—From Mr. Robert Heakesly, of Liverpool, stating, that he had purchased a cargo of the Welsh Burrs, and had manufactured one pair of stones above four feet diameter; that he is of opinion that they are of the nature of the French Burr-stone, and a complete substitute for that article; that, from every information he could collect, the discovery is of considerable importance to the public in general, and to the agricultural interests of these kingdoms in particular.—From Mr. James Lund, Mill-stone Maker, and Mr. Joseph Tyrer, P Millwright,

Millwright, both of Liverpool, certifying, that they had seen and considered the nature and appearance of the Conway Burrs, and were of opinion, that they are a perfect representative of the French Burr-stone, and that, under such impression, they had purchased a quantity, and vested a sum of money therein for the purpose of manufacturing it into Millstones.—From Mr. Edward Doughty, of Bristol, stating, that he had received from Mr. Bowes a cargo of Conway Burrs, consisting of upwards of forty tons; that from his observation while under the tool, and from the texture of the Burr-stones, he was firmly of opinion they would answer the purpose of French Burrs; and that he had been a manufacturer of that article more than ten years.—From Sir Joseph Banks, noticing, that the certificates Mr. Bowes had produced to him were perfectly satisfactory, and had convinced him that
the

the discovery was of considerable importance to the public.

Mr. Robert Ardlic, of the King's Mills, Rotherhithe, observed, in a note to the Society, that a pair of the Conway Burrstones had been worked there ever since the month of August last ; that on weak streams of water, and where they were not required to grind faster than at the rate of three or four bushels an hour, they would answer the purpose ; but that he was doubtful whether they would be equal to good French Burrs.

Mr. Joseph Jackson, of the Tide-Mills, Liverpool, informed the Society that he had only tried a single millstone made from the Welsh Burrs, which was a bed-stone ; that the stone which he worked upon it was a very fine French stone, and that they answered very well together.

The Committee, to whom the examination of the merits of Mr. Bowes's Millstones was referred by the Society, de-

sired the attendance of Mr. Fowles, of London-Bridge Water-works, and Mr. Norton, of Tooley-Street, Millwright: these gentlemen obligingly waited on the Committee, when Mr. Fowles gave it as his opinion, that if a proper person was appointed to the superintendance of the Conway Quarry, stones would be brought from thence fit to answer every purpose of the French Burrs; Mr. Norton was of the same opinion; and further observed, that he had occasionally purchased large quantities of Burr-stone from France; that the French Stones differ much in quality from each other; and that, in some parts of England, the preference was given to one kind, and in other parts to other kinds. Mr. Norton remarked, that wheat differs in hardness and texture, according to the soil on which it is produced; that the wheat of different districts, therefore, required stones of various degrees of hardness and texture to grind it; and the

the Conway Quarry seemed likely to answer the purposes of the different counties, from the varieties of texture in the stone which it furnishes. He further noticed generally, that the mill-stones, formed from large pieces, are not usually so good as those made from small pieces of stone properly selected, large pieces being seldom uniform in quality. Mr. Middleton, of Lambeth, confirmed Mr. Norton's observations on wheat; he also produced specimens of French Burr-stones, which the Committee compared with the specimens of Conway Stone, from which, on examination, they did not appear essentially to differ.

A remark has already been made, that the Conway Stone becomes much harder by exposure for a length of time to the air. From external marks, it appears to be composed of quartz and cherts. It has been observed, that the Conway Stone has been manufactured into Mill-stones within a few days from the time

of its leaving the quarry ; and that, even under this disadvantage, it has given satisfaction to the persons who have used it. It is not unreasonable to conclude, that, by allowing it to harden in the air for the time which intervenes from the separation of the French Burrs from their quarry, to their actual use in England, and forming the Conway Millstones upon the principle noticed in the letter received from Messrs. Stephens and Co. above quoted, they will supersede the use of French Burrs, and become a great national benefit.

It is much to be lamented that Mr. Richard Bowes died at Conway in March last, leaving a widow and two children, before he had acquired a fortune due to his unremitting attention, industry, and merit.

The Society has been lately informed, that Mrs. Bowes is at Conway, and that Mr. B. Chetney, of Newcastle, in Staffordshire, has the late Mr. Bowes's affairs in his hands,

The

THE GOLD MEDAL, OR FORTY GUINEAS, at the option of the Candidate, being the Premium offered for inventing a PARISH OR FAMILY-MILL, was this Session adjudged to Mr. THOMAS RUSTALL, Wheelwright, of Purbrook-Heath, near Portsmouth, and who made choice of the pecuniary Reward.

THIS Mill promises to be of great public utility, as it can be constructed at a moderate expence, and stands on a small space of ground. It may be worked within a room in a farmhouse, or even in a public kitchen, without occasioning much incumbrance.

Its peculiar excellence consists in this circumstance, that, from the vertical position of the stones, action may be given to it without the intervention of cogs or wheels: it may be used to grind malt, to bruise oats for horses, or to make flour, or for all these purposes; and it

can easily be altered to grind fine or coarse, as occasion may require.

It may be worked by one man ; but if two persons are employed, it will furnish, in two hours, a sufficient quantity of flour to serve a family of six or eight persons for a week. The farmer, by allotting half an hour's time in the evening for its use, may make comparative experiments of the quality of his grain, and, at a trifling expence, provide himself with flour from his own wheat, without fear of sophistication, or being liable to the caprice or defrauds of a miller.

Repeated satisfactory experiments have been made with this Mill before Members of the Society ; and the original Mill is now in their repository for the inspection of the public.

The following Certificate was received with the Mill :

THOMAS RUSTALL, of the parish of Farlington, in the county of Southampton, Wheelwright, having bestowed

stowed a great deal of time and expence in inventing and making a new Hand Corn-Mill, and having received two letters from Mr. More, the late Secretary of the Society, encouraging the same to be brought up and exhibited to the Society on the first Tuesday in February next:

We, the undersigned, do hereby certify, that we have seen the said Mill at work, which grinds the corn very well, and at the rate of one bushel of wheat within the hour, by the assistance of one man and a boy. The inventor is a poor man, with a large family, and we beg leave to recommend him to the Society's notice. Dated at Farlington, the 27th day of January, 1800.

G. RICHARDS, Minister.

GEO. PLUMMER, Churchwarden.

JAMES MOORE, Inhabitant.

To the Society for the Encouragement of Arts, Manufactures, and Commerce, London.

*Reference to the Plate of Mr. RUSTALL'S
FAMILY-MILL. (Plate I. Fig. 1.)*

A, the handle of the Mill.

B, one of the mill-stones, about thirty inches diameter, and five inches thick, moving with its axis C.

D, the other mill-stone, which is stationary when used, but may be placed nearer to, or further from, the moveable stone B, by means of three screws passing through the wood-block E, which supports one end of the axis C, after it has passed through a perforation in the centre of this bed-stone. Through this hole also the grain passes from the hopper F into the Mill.

F, the hopper, to which an agitation is given by two iron pins fixed on the axis C, which alternately raise this hopper containing the grain intended to be ground: the hopper sinks again by its own weight; the corn is delivered by
this

this motion through a spout, passing from the said hopper into the centre of the Mill behind, and through the bed-stone D.

G, a paddle which regulates the quantity of corn to be delivered into the Mill; a greater or less quantity of which may be furnished, by raising or lowering the paddle.

H, the receptacle for the flour, into which it falls from the mill-stones when ground.

The bed-stone D rests upon two supporters of wood, one of which is shewn at I: these supporters are screwed to the block E, and also morticed into the lower frame-work of the mill at K: the frame-work is held together by pins or wedges L L L, which admit the Mill to be easily taken to pieces.

M, a fly-wheel placed at the furthest extremity of the axis C. On this fly-wheel another handle may be fixed occasionally.

N,

N, a small rail which preserves the hopper in its place ; the furthest part of the hopper rests on a small pin, which admits sufficient motion for the hopper to shake forward the corn.

O, a spur-rail, to strengthen the frame-work of the Mill.

P, the front upright, which is morticed into the frame-work of the Mill ; this is a rest for that end of the iron axis C which is next the handle. There is a shoulder on each end of the axis, to keep it steady in its place.

N. B. A cloth-hood fixed to a broad wood hoop, is placed over the stonies whilst at work, to prevent the fine particles of flour from flying off.

Account of Mr. RUSTALL'S BOLTER.

A bolter or sifter to separate the flour from the bran, being necessary to use along with the Mill above described,
Mr.

Mr. Rustall furnished the Society with one made upon a very useful and simple construction, which is also placed for inspection in their repository. This machine is applicable to other purposes; and as its being generally known may prevent many inconveniences which attend the levigation of noxious articles, and a waste of their finer particles, an engraving and description of this Bolter is annexed for the benefit of the Public.

Plate I. Fig. 2. represents the bolter, the front of which is removed, to show its interior construction; its length is 3 feet 10 inches, its breadth $19\frac{1}{2}$ inches, its depth 18 inches.

A, is a moveable partition, which slides about four inches backwards or forwards from the centre of the box, upon two ribs of wood, fixed to the back and front of the box, one of which ribs is shown at B.

C, the lid of the bolter represented open.

D,

D, a slider moveable in a groove in the lid by two handles on the back of the lid.

E, a forked iron fixed in the slider D: this fork, when the lid is shut, takes hold of the edge of the sieve F, and moves it backwards and forwards on the ribs of wood B, as the slider is agitated.

G, a fixed partition in the lower part of the centre of the box, to separate it into two equal parts, in order to divide the fine and coarse flour; the slider A moves about four inches each way from this partition, and thereby gives room for the sieve F to be worked.

H, a board parallel to the bottom of the bolter, and forming part of the slider A. The use of this board is to prevent any of the sifted matter from falling into the other division.

I, represents two of the back-feet on which the bolter stands.

Plate

Mr. Tho. Pustall's Family Mill and Bolter.

Pl. I.

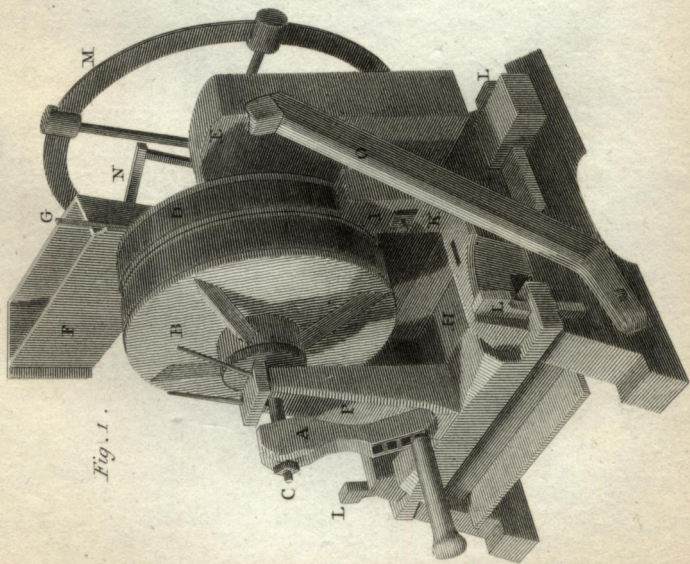


Fig. 1.

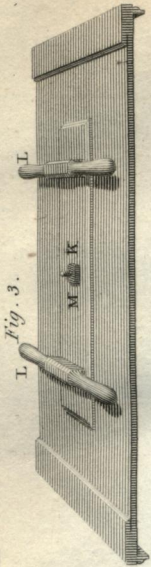


Fig. 3.

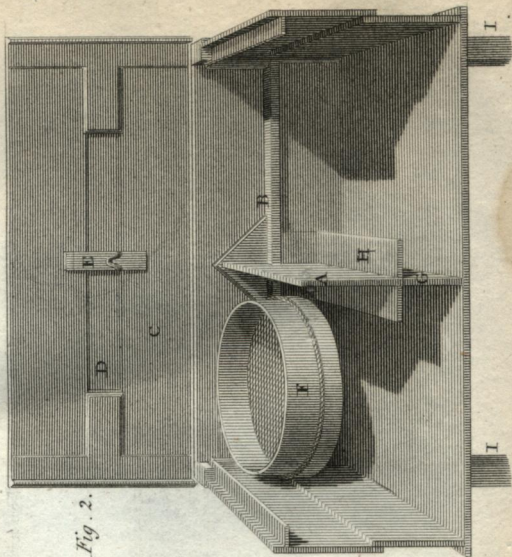


Fig. 2.



Fig. 4.

Drawn & Engraved by Langry.

Plate I. Fig. 3. shows the top or upper part of the lid of the bolter.

K, the slider which moves the length-way of the bolter.

LL, handles which work the slider.

M, a screw holding the fork which gives motion to the sieve.

Plate I. Fig. 4. the forked iron shown separate from the lid.

A Bounty of FIFTEEN GUINEAS was this Session voted to Mr. S. HOLMES, Smith, of Castle-Court, in the Strand, for an OVEN, of his invention, heated without Flues, of which a description and print are here given, and which Oven is reserved by the Society, for the inspection of the Public.

S I R,

I TAKE the liberty of presenting, for the approbation of the Society, an Oven upon a new plan, which I call a Conducting Oven. The Ovens in general use are made with flues, which destroy a great quantity of fire in its passage through them, and much trouble is required to keep them heated. The fire which should be employed in roasting meat, is in a great measure dissipated in the flue of the common Ovens, if used
at

at the time of roasting, or the common oven does not require sufficient heat to answer the purpose, unless much coal is consumed.

My invention consists of a cast-iron Oven, with a solid piece of iron projecting from its side into the fire, in which this piece constantly remains, and becoming red hot, communicates sufficient heat for baking to the whole Oven, and even assists the fire in roasting.

My Oven keeps continually at a baking-heat, without expence or trouble, as the common fire is sufficient for the purpose. The first Oven, which I made for experiment, was fixed in my own house, for use, eighteen months ago, and may be viewed at any time the Society think proper. Others are also in use at Mr. Blackmore's, in Brompton; Mr. Esdale's, the Banker, in Clapham; Mr. Robinson's, at Kensington; Mr. Roe's, at Battersea; and the Rev. Mr. Wise's, at Carlwood; all of which have even exceeded my expectations.

I have no doubt, if you think it necessary, that those gentlemen will give me certificates of their utility.

I should desire you would excuse my giving you this trouble; but as I know the liberality of the Society, where any improvement is made that may be of advantage to the public, I am emboldened to lay this invention before you, requesting such reward as it may be thought to deserve.

I am, SIR,

Your most obedient Servant,

S. HOLMES, Smith.

*Castle-Court, Strand,
April 2, 1800.*

MR. CHARLES TAYLOR.

Mr.

MR. HOLMES has put up one of his new-constructed Ovens at Mr. Roe's school, in Battersea, which answers the purpose exceedingly well.

THOMAS ROE.

No. 58, Strand.

I DO hereby certify, That Mr. Samuel Holmes, smith, of Castle-Court, has put up in my house an Oven upon his new construction, with a knob on the side; which Oven answers every purpose for which it was intended, and bakes equally well with a baker's oven.

EDWARD BLACKMORE.

*Old Brompton,
April 17, 1800.*

Mr. HOLMES,

THE Oven you have put up for me answers the purpose well; and should it lie in my way to recommend you, I shall feel a pleasure.

Yours truly,

J. NIXON.

*No. 2, Little Britain,
April 10, 1800.*

Mr. HOLMES,

IN answer to your application for my testimony respecting the Oven you applied to the side of my kitchen-range, I am happy to say, that in point of heat, it has answered full as well as the iron ovens heated by separate fires.

I am, SIR,

Your humble Servant,

SAMUEL SAXON.

Cannon-Row.

IN order to ascertain fully how the Oven answered, a Committee, appointed by the Society, ordered, on the 17th of April last, two Ovens, of similar forms and dimensions, to be fixed to the sides of a fire grate, in the model-room of the Society, one of which ovens only differed from the other by the piece of cast-iron projecting from its side into
the

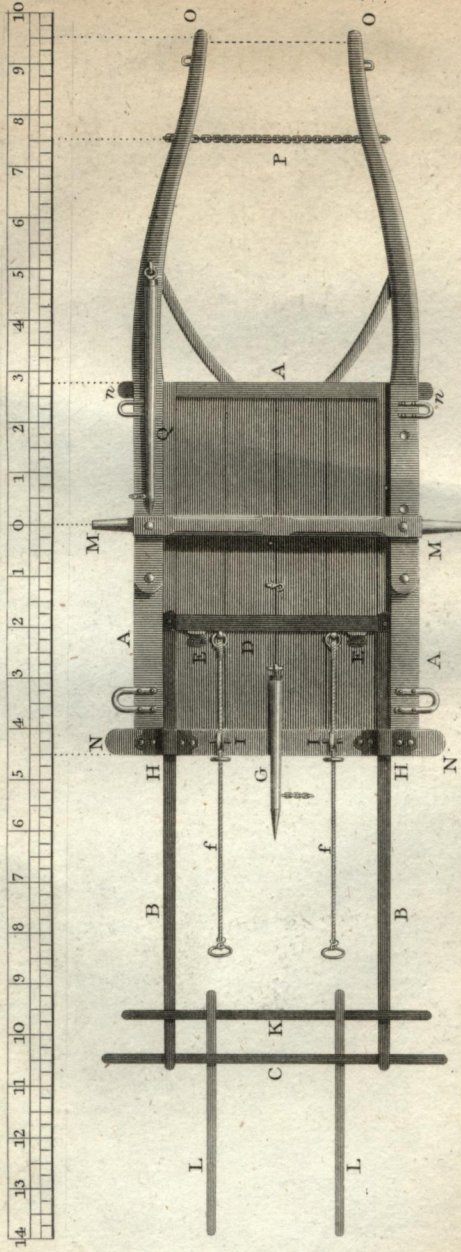
the fire : both ovens were heated by the same fire, and fixed in mortar and brick work in a similar manner.

Two loaves, of equal size and quality, being prepared from the same dough, one was put into each oven ; and after remaining therein three quarters of an hour, they were taken out at the same time, and examined. The loaf from Mr. Holmes's oven was in every respect well baked, but the other was dough-baked and imperfect. An Oven upon Mr. Holmes's construction has been since fitted up in the Register's kitchen, which appears to answer every purpose that could be expected from its size, which is $13\frac{1}{2}$ inches wide at the door, or in front, and 15 inches deep.

A reference to *Plate II. Fig. 1 and 2*, will explain more fully the construction of the Oven, and its principle of action.

- Fig. 1.* A perspective view of the Oven.
2. A horizontal section of the same.
 - A. That side of the Oven which is placed next the fire.
 - B. The projecting piece of iron which remains stationary in the fire, and communicates heat to the Oven.
 - C. The door of the Oven.

W. J. Smart's Sliding Lever for Relief of Horses.



M. S. Holmes's Family Oven.

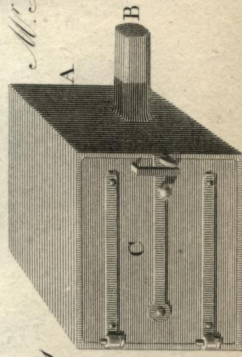


Fig 1

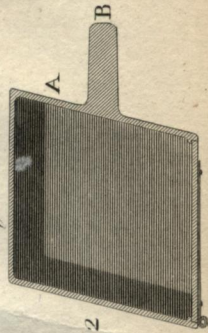


Fig 2

The Thanks of the Society were this Session voted to Mr. JOHN SNART, No. 209, Tooley-Street, London, for the following Account and Drawing of a SLIDING LEVER fixed to the under side of a Cart, for the relief of Horses when thrown down and entangled in the Thills. The Society wish, for the sake of humanity, to alleviate the cruelties to which horses are subjected, and hope the plan here given will afford a useful hint for further improvements in this line. This Machinery will also afford some advantages in loading carts, where the common length of the cart is too short for the articles intended to be carried.

DESCRIPTION *of the* SLIDING LEVER
invented by Mr. JOHN SNART, Optician,
London, for the improvement of Carts,
and relief of Horses, and which may be
applied to all two-wheel Carriages. This
invention he calls an ALEXIPPOS. (See
 Plate II.)

A A A, plan of a common town cart
 inverted.

B B, Sliding bars or levers, *i. e.* the
 Alexippos.

C, Cross-bar, or handle of the Alex-
 ippos.

D, the connecting bar to project the
 Alexippos.

E E, stops, to prevent over-drawing
 ditto.

f f, ropes and hand-rings to project
 ditto, which may be put under the sliding
 bars B B.

G, prop to prevent hanging the horse.

H H, the bearing plates of the Alex-
 ippos.

I I, the pulleys, or shivers.

K,

- K, the extra bar for country carts.
LL, the handspikes for ditto.
M M, the axle-tree, or fulcrum.
N N n n, hind and fore ear-breadths.
O O, the extremities of the shafts.
P, the back chain.
Q, the prop.

S I R,

AS all librating bodies act in an exact and direct ratio to their elongations from the fulcra, considered in connexion with their proportion of weight, and *vice versâ*, (the first resistance by the inequality of their matter being excepted), it appears, that as is the solidity of the part resting on the fulcrum, to the solidity of its extremities, so is its resistance to be acted upon by a weight which is less than its disproportion; which inequality of power is to the weight added in an inverse ratio, but directly as the diminution.

It

It is evident that the construction of carts at present is very unfavourable to the relief of the fallen horse, who is intentionally placed at the longest arm of the lever (for the shafts act as a lever by supposing the axle-tree to be the quiescent fulcrum), that he may the better resist the weight of the load, should the equilibrium be by any means destroyed; for any given weight upon the hind part of the cart has less than half the power of resistance of the horse; so that, if such horse falls, this advantage is prejudicial to his being raised. The inventor, therefore, of the Alexippos, presumes that a plan, the basis of which is humanity, will sufficiently apologize for his offering to the public an invention which so obviously more than counteracts the before-mentioned disadvantages, as may be seen by inspecting the plan in connexion with its scale.

Let A A A (*Fig. I.*) be a plan of the common town cart, whose hind ear-
bred,

bred, or ear-breadth, N N, projects from its fulcrum, or axle-tree, M M, 4 feet 7 inches, while the back chain P is 7 feet 6 inches; and the extremes of the shafts, O O, which press upon the tuggs in the horses collar, are 9 feet 6 inches. Now, admitting that the horse who falls weighs 15 cwt. and that his bearing is 1 cwt. which is 16 cwt. it is very evident that it will require 3316 lb. weight gross at the ear-breadth N N, (which is but 4 feet 7 inches from the fulcrum M M), to counteract such a weight; even admitting that the load had not slipped forward at all by the concussion and depression of the fore parts of the cart. The estimate, therefore, now will be nearly as follows: 4 feet 7 inches, or 55 inches, to 9 feet 6 inches, or 114 inches, will give for the weight 3316 lb. which is more than that of twenty-two men, at 150 lb. weight each, before a disabled horse can be raised from the ground: but we know that six men cannot bear their

their weight with advantage on one of our present-made carts, without endangering their persons or clothes, or both; so that the horse is left to struggle with three-fourths of the weight himself, and this in a very bad posture, as he is embarrassed by the shafts, &c. Hence, many horses, if not immediately killed, are at least ruined for ever.

The advantage of the Alexippos is in the proportion of 126 inches, the length of the levers at C, to 11 $\frac{1}{4}$ inches, the length of the shaft, viz. OO; and this without the addition of the handspikes LL, which gives a further advantage of one-fourth. Again, if 55 inches, the length of the lever, at NN, require 3316 $\frac{2}{3}$ lb. weight, what will 126 inches require? Answer, 1447 $\frac{5}{8}$ lb. which is less than the weight of ten men, at 150 lb. weight each. This, however, is not half the advantage of the Alexippos, as it affords convenient accommodation for more than twenty men, without hazard
to

to clothes or persons. And, if we suppose a sliding bar at K, one man, (if men are scarce, as in the country) by applying the two handspikes L L, may gain power sufficient to raise his horse himself, especially as it fortunately happens that country luggage very frequently consists of such articles as might be removed from the front of the cart, and placed on the bars C and K ; such, for instance, as sacks of corn, seed, potatoes, bran, flour, peas, beans, &c. &c. which, by being taken from the front, and placed behind, would have more than double the advantage of its real weight ; and, in town, where the luggage is different, assistance is always to be obtained from humanity.

Notwithstanding the statement of powers for relief which I have here given, it is plain, from daily observation, that less than half the power here stated is only used in general, as eight or nine men can often (though with much danger

ger and trouble) raise the fallen horse. Hence, by using the Alexippos, three or four men, without danger, delay, or trouble, will be sufficient.

I remain, SIR,

Your obedient servant,

JOHN SNART.

July, 1799.

To the SECRETARY.

A Bounty of FIFTEEN GUINEAS was this Session voted to Mr. THOMAS ARKWRIGHT, of Chorley-Moor, in Lancashire, for a DOOR or CHEST LOCK, of a peculiar construction, for securing Property from PICKLOCKS and HOUSEBREAKERS. This Lock has two Bolts so formed, that if the Key should by accident be left in the Lock, it would be scarcely probable that a Servant could unlock them. A Description and Print of the Lock are annexed; and the Lock itself is reserved in the Society's Repository, for the inspection of the Public.

DESCRIPTION of Mr. ARKWRIGHT'S
LOCK, PLATE III.

- A. **T**HE pointer on the shank of the key.
- B. The pin on which the key turns.
- C. The

- C. The top-bolt of the lock.
- D. The upper higher tumbler for the top bolt.
- E. Another tumbler for the top-bolt, and placed underneath it.
- F. A lever which works both bolts, and moves on a centre G.
- H. The lower bolt, with a joint I upon its head.
- K. The lower tumbler, with two joints LL, which fall into two notches of the top-bolt. Underneath the lower-bolt is another tumbler similar to that marked E.—There are five springs within the lock, four of which act upon the upper and lower tumblers, the other on the joint-bolt H.
- M. The bottom part of the key. The dark ring in the centre represents the hollow to be applied to the lock pin B, above mentioned.

DIRECTIONS

DIRECTIONS *for working the* DOUBLE-BOLTED LOCK, *invented by* Mr. THOMAS ARKWRIGHT, *of Chorley, in the County Palatine of Lancaster.*

FIRST, place the head or bolts of the Lock towards the left-hand; then take the key with the right-hand, with the small pointer A, in the shank of the key towards the right: after this, put the key down to the bottom of the socket upon the centre-pin B, in the lock, and give one half-turn with the pointer, in the shank of the key, upwards; by which the bolt C at the top will be locked. In the next place, draw back the key about one inch, so that the webs or bits of the key may clear the tumblers in the lock; then turn the key with the small pointer towards the right hand, and put down the key in the manner above mentioned. After this, make one half-turn with the pointer in the

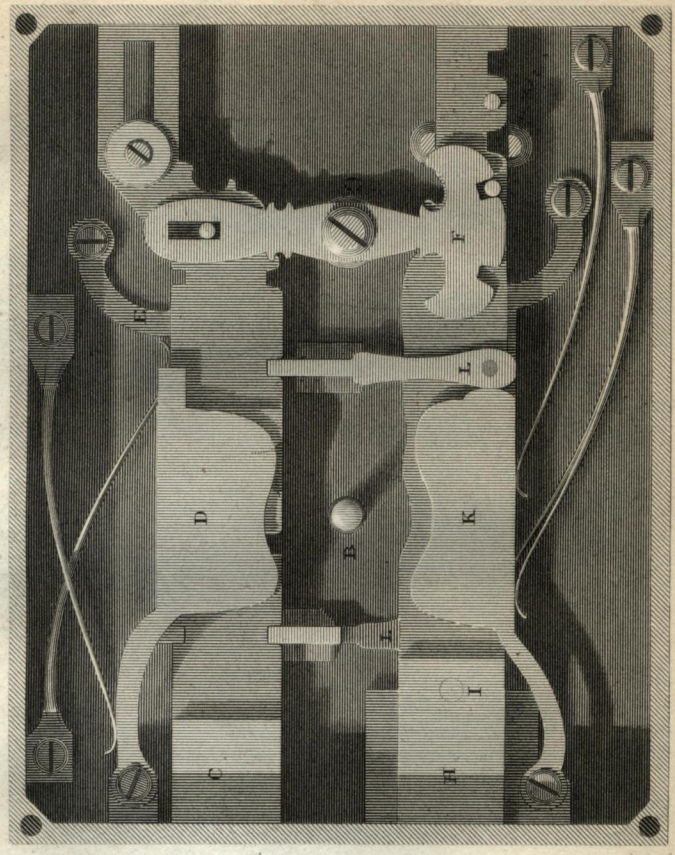
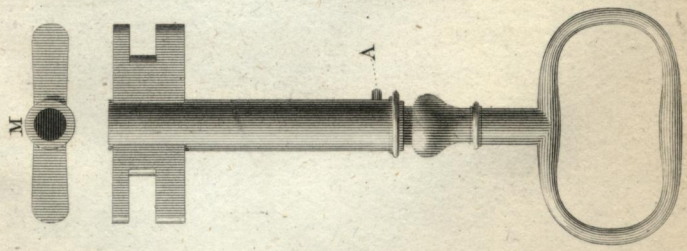
R

shank

shank of the key downwards, by which mean the lower bolt H is locked, and the higher bolt C unlocked. Then draw up the key as aforesaid, and turn it with the pointer in the shank to the right hand. In the last place, thrust down the key, and give one half-turn with the pointer, in the shank of the key, upwards, by which mean both the bolts, C and H, will be locked; so that, when the bolts are to be unlocked, the pointer in the key must be towards the left hand, and must be worked as above directed.

A Bounty

Mr. Tho. Arkwright's Door Lock.



A Bounty of TEN GUINEAS was this Session voted to Mr. WILLIAM BULLOCK, No. 6, Portland-Street, Soho, for a LEVER LOCK-BOLT for FOLDING-DOORS, by means of which the upper and lower Bolts are withdrawn with ease by the turn of a common Door-handle, and the same Bolts shot and fastened merely by pressing the Door to its proper place. The following Letter was received from him, and an elegant Model of this Invention is left in the Repository of the Society.

S I R,

I SEND with this, for the inspection of your Society, the working part of a Rack or Lever-bolt, which prevents the bolts from becoming stiff by rust.

From the benevolence of the Society to me in 1797, for my Reliever for a

R 2

Rack-

Rack-bolt, I was induced to make further trials to bring it to perfection.

I believe the method now produced will answer every purpose that can be desired, as it works very easy; is not liable to want repair, nor to be much, if any, injured by rust. I have lately made, and tried several, which answer very well, which induces me to lay this method before the Society, as an improvement in the machinery of a Rack-bolt, or, more properly, of a Lever-bolt.

I remain with respect, SIR,

Your humble Servant,

WILLIAM BULLOCK.

No. 6, *Portland-Street, Soho,*
March 25, 1800.

MR. TAYLOR.

DESCRIPTION

DESCRIPTION of Mr. WILLIAM BULLOCK'S LEVER LOCK-BOLT.

THE handle, in external appearance, resembles the round door-handles in general use ; when moved, it acts in a double chain fallow: the lower chain communicates with a lever which has a pivot near its centre, the extremity of which lever raises up the lower bolt of the door when shut ; the upper chain communicates with another lever connected with the upper bolt, which it draws down by moving on a pivot near the centre of the lever ; and thus the bolts are opened. The upper bolt being stopped down by a reliever at the top of the door, the bolts are prevented from grating either at the top or bottom of the door. On shutting the door, the reliever is pressed in by the wood-work at the top of the door, which sets the bolts at liberty ; the lower bolt then falls down,

and the upper bolt is propelled by two springs which act upon the upper and lower levers, and the door remains firmly bolted.

A great advantage arises in the use of this invention, from the whole of the machinery acting upon pivots, which are not liable to rust, but allow a regular and easy motion to the bolts.

THE GOLD MEDAL, OR THIRTY GUINEAS, at the option of the Candidate, was this Session adjudged to Mr. GEORGE DAVIS, as a Bounty for his Invention for preventing Passengers in Carriages being injured when the Horses have taken fright; from whom the following Account and Certificate were received, and who made choice of the pecuniary Reward. A Model of this Machine may be seen in the Repository of the Society.

S I R,

I HAD the honour some months ago of giving in a claim for the Premium offered by the Society to any person who should invent a method of “ Extricating Horses from a Carriage, to prevent Passengers from being injured;” but not having *then* brought it to that

R 4 perfection

perfection I could have wished, I informed the late worthy Secretary, Mr. More, that I should withdraw the claim for that Session. It is now completed, and ready for any inspection or trial before mechanical men, that the Society may judge expedient; and I therefore renew my application for the Premium.

Having affixed the apparatus to a coach, I should conceive it would not be necessary to enter into a very particular description of it. I shall therefore only relate the manner of operation.

“ It is fixed behind the splinter-bar, and the communication, by means of a copper chain, is carried through the boot to the side of the coach-box, that, in case of the horses taking fright, or, of that more fatal accident, the reins breaking, which precludes the possibility of stopping the horses, the coachman can discharge them instantaneously.” There is this superiority in my invention, over any other method hitherto put in practice,

tice, "That the horses can be liberated, even when the pole is at right angles, or locked close to the perch, a position which otherwise overturns a carriage." I have had the honour of exhibiting a trial before His Majesty, and discharged the horses three times; which Mr. Vidler, of Millbank, can attest, having been present on the spot, and who was pleased to say, that he thought, if it was more generally known, no carriage would be without it.

I am, SIR,

Your obedient humble servant,

The CANDIDATE.

Nov. 13, 1799.

To the Secretary of the
Society of Arts, &c.

SIR,

S I R,

BEING informed that Mr. George Davis, of Windsor, has put in a claim for the Premium offered by the Society for releasing four horses from a carriage when in full speed, I have the pleasure of informing you, that I saw it performed three times before His Majesty in Windsor Great-Park, on the fourth day of March, 1799; when it fully answered every purpose for which it was intended; and, in my humble opinion, may be applied to carriages in general, and does much credit to the inventor as a mechanic.

I am, SIR,

Your humble servant,

J. VIDLER.

*Millbank Factory,
Millbank-Row, Westminster.*

To the Secretary of the
Society of Arts, &c.

The

THE Committee of Mechanicks, to whose consideration this business was referred by the Society, appointed a trial to be made near the Magazine in Hyde-Park, on Thursday the twenty-seventh of March, 1800, with a coach, to which the apparatus was attached. Four horses and two postillions were employed for the purpose. A person sitting on the coach-box loosed the pole and rollers from the carriage, by pulling a chain placed near the boot, which chain drew back the bolts in the splinter-bar, and allowed the pole and rollers to be carried off by the horses, at a time when they were galloping at the rate of more than ten miles an hour. The experiment was repeated thrice, and the horses disengaged each time; but the impetus given to the carriage by the velocity of the horses, occasioning the coach to run forwards above twenty yards on levelground, after the horses were detached, the Committee were of opinion, that a part, but
not

not the whole of the object of the Society was answered, as the passengers in the carriage might yet suffer injury from the motion of the carriage after the horses were liberated. On their noticing this circumstance to Mr. Davis, and a gripe being added to stop the motion of the wheels, Mr. Davis, on the eighth of May last, produced the present ingenious invention to the Committee; by means of which, at one pull of the chain, the horses may be liberated, and two bolts propelled on the nave of the two fore-wheels, so as to retard their motion. For this invention and apparatus, a Bounty of Thirty Guineas was awarded and paid to Mr. Davis from the Society.

DESCRIPTION of MR. DAVIS'S MODEL,
PLATE IV.

Fig. 1. A, the splinter-bar of a carriage, to which the horses are attached
by

by the traces fixed to the rollers BBBB, and to the pole C.

D, a brass chain extending from the coach-box to the splinter-bar: this chain goes under the roller E, over the roller F, is then wound once round the pulley G, and thence directed by the small rollers H and I to the quadrant K, to the furthest extremity of which it is attached.

The quadrant K has a vertical axis, on the upper part of which is a pinion with four teeth, (see L, *Fig. 2* and 3). This pinion works in two racks, MM, fixed on two elbow head bolt-bars, NN; and, by means of these racks, the bolts are moved backwards and forwards by the action of the quadrant K.

These bolt-bars extend from the centre of the splinter-bar to its extremity, the strait end of the bolts shooting into the rollers BB, *Fig. 1.* at the end of the splinter-bar, and the elbow-heads, *nn*, shooting into the two centre rollers BB.

On

On the lower part of the axis of the quadrant K is a female screw, which receives a bolt O, (see *Fig. 3*). one end of which, when bolted, passes through the bolt C: the other end of it is a male screw.

P Q are two collars fixed on the splinter-bar, which collars confine the axis, and prevent its being displaced.

Fig. 4. shows the pulley G, round which the chain D passes: the axis of this pulley contains two female screws, R S, with threads in different directions moving the two bars T V, backwards or forwards, so as to protrude them on the conical part of the naves of the forewheels of the carriage, and to act as a brace thereon, so as to retard their motion.

Fig. 5. is a link of the chain, in order to show its make or formation.

When the horses are to be detached, and the carriage stopped, the coachman, sitting on the coach-box, draws
up

up a handle *W*, *Fig. 1.* affixed to the chain *D* by means of an iron bolt with a spring upon it, to retain it when drawn out: the chain *D* pulls back the quadrant *K*, and draws back the double bolts *NN*, which pass through square holes at the lower end of the rollers *B*. The same motion of the quadrant, by means of its female screw, raises the screw-bolt *O*, and sets the pole at liberty; so that the horses move off with the pole and rollers. It has been before observed, that the chain *D* winds once round the pulley *G*; by this means, when the chain is drawing up to detach the horses, the motion of the pulley propels, from its female screw on each side, bolts which have screw-heads at one end, and wedges at the other, which wedges, when propelled, act as braces on the conical-formed naves of the fore-wheels, and stop the motion of the fore-wheels.

X is a square head on the axis of the quadrant *K*: by means of a key applied

applied on this head, when necessary to attach the horses to the carriage, the quadrant is returned to its place, and bolts the rollers and pole, after they are replaced in their proper situations; the quadrant at the same time pulls back the chain on the pulley G, which pulley draws back the wedge-bolts from the conical naves of the fore-wheels, and sets them free to move.

A Bounty

